Homework 2

Recitation problems for Tuesday Feb 2, 11:15am-12:15pm

The following questions from Alon and Spencer, pp.10-11 (11-12 in 2nd ed.): 3-7, 9, 10.

Written problems for Tuesday, Feb 2nd, 2010

Turn in at the beginning of class, or in my mailbox at any time before class. Don't forget to read the homework collaboration and use of references policy on the first day handout if you have not already.

1. Exercise 1, p. 11 (p. 10 in 2nd ed.), Alon and Spencer.

2. Suppose $n \geq 2$ and let H be an n-uniform hypergraph with at most 4^{n-1} edges, with vertex set V. Show that there is a coloring of V so that no edge is monochromatic.

3. Exercise 2, p. 11 (p. 10 in 2nd ed.), Alon and Spencer.

4. Exercise 8, p. 12 (p. 11 in 2nd ed.), Alon and Spencer.

5. A *matching* in a (simple) graph is a set of edges M of G such that no vertex appears more than once in the whole set. A matching can also be understood as a way of pairing up some or all of the vertices of the graph. Let G be a graph with $e(G)$ edges and a matching of size $|M|$. Assuming that you know M and G, somehow construct a random bipartition of G and use the First Moment Method to prove that G has a subgraph with at least $(e(G) + |M|)/2$ edges.